HI-TECH INSTITUTE OF ENGINEERING &TECHNOLOGY

B. Tech –
MODEL PAPER-2
FUNDAMENTALS OF Electronics Engineering

Time: 03:00 hrs

Total Marks: 70

Note: (1)   Attempt questions as per instructions given against them.
       (2)   Be precise in your answer.

SECTION - A

Ques-1 Attempt all parts of this section :   (2X 7 =14)

   a. If α of transistor changes from 0.981 to 0.987, find the % change in β.

   b. What do you mean by Offset in OP_AMP. List the ideal characteristics.

   c. What do you mean by slew rate?

   d. A Ge Diode carries a current of 1mA at room temp. when forward bias of 0.15v is applied. Find the reverse saturation current.

   e. Convert the following:

       i. $(3509)_{10} = (?)_{16}$

       ii. $(54)_{10} = (?)_4$

   f.   Convert the following in SOP or POS: $Y= AB+ AC+ BC$

   g. Draw the basic block dig of communication system.

SECTION- B

Quest- 2 Attempt any 3 parts of this section :   (7 X 3 =21)

   a. i. For the given clamper circuit determine the output voltage and draw the output waveform.
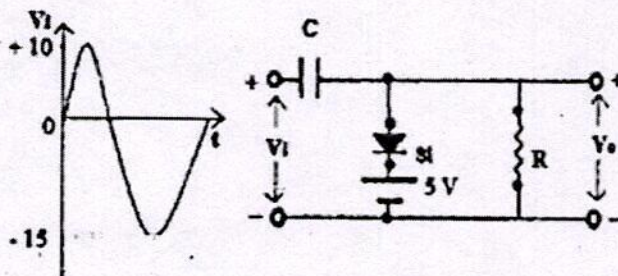
       ii. For a Half Wave Rectifier derive the expression of Ripple factor and TUF.

   b. i. Explain the working of JFET and explain its input output characteristics.

       ii.Explain EMOSFET with input output characteristics.

c. i. Explain the working of OP-amp as Integrator and differentiator.

ii. Find the output of the given circuit :
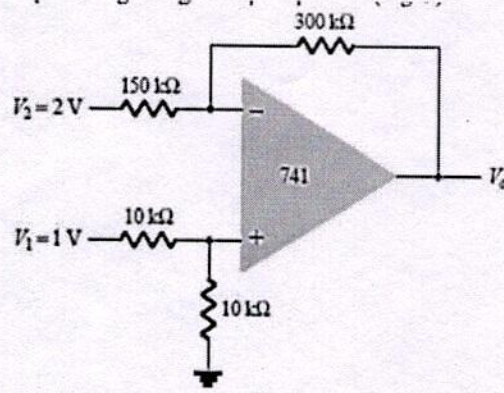
d. i. What do you mean by Universal Gates? Design the XOR and XNOR gate with the help of any 1 Universal gate.

ii.

a> Determine the value of x if $(193)_x = (623)_8$

b> Perform the following operation : $(756)_8 - (637)_8 + (725)_{16}$

e. i. What do you mean by Modulation? Explain the need of modulation.

ii. The output voltage of transmitter is given by $300(1+0.5\sin 50t) \sin 2.14 \times 10^7 t$. This voltage is fed to a load of 600 ohm resistance. Determine:

i. Carrier Power   ii> Modulating Frequency

iii. Total Power Delivered.

ii.What do you mean by Radar ? Explain the elements of Radar Communication. What are the applications of RADAR ?

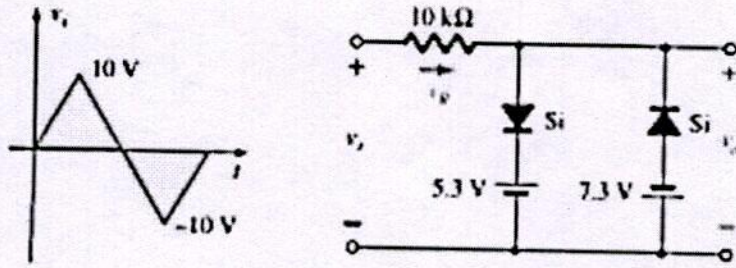f. i. Explain the working of IoT. Advantages and disadvantages of IoT along with its applications.
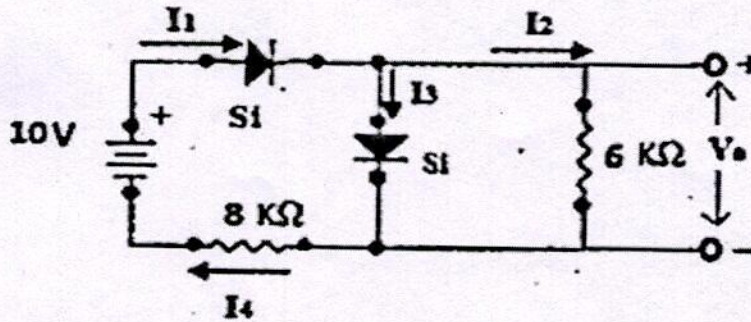
ii

SECTION- C

Ques 3. Attempt all parts and 1 of each of section.

$(7x 5 = 35)$

a. i. For the given network find the output voltage:

ii. Determine the currents I_1, I_2, I_3, I_4 and V_o for the network shown:

a. i. Explain the working of Full wave Doubler, Tunnel Diode and LED.

ii. Draw and explain the working of Zener Diode as a Shunt regulator. For the Regulator circuit if Rs= 240 ohm, Vz= 12 Volt, R_L= 500 ohm V_{in}= 30 Volt, Calculate the value of Zener current, Load current and source current.

b. i. Explain the working of Depletion MOSFET along with its VI characteristics.

ii. Explain the working of Common emmiter configuration along with its input output characteristics.

c. i. Explain the working OP-Amp as an Inverting adder for 3 inputs.
ii. Draw and explain the working of OPAMP as an integrator. Draw its input output charcteristics.

d. i. Define Amplitude modulation and derive the equation of AM wave.

iii. Minimize the SOP expression given below using K-map.

$y= \Sigma m (1,3,7,11,12, 15) + \Sigma d(0,2,5,8,14)$